

ANALYZING THE RELATIONSHIP BETWEEN PUBLIC AND EXTERNAL DEBT SUSTAINABILITY: CASE STUDY ROMANIA

Campeanu Emilia

Academy of Economic Studies Bucharest, Faculty of Finance, Insurance, Banking, and Stock Exchanges, Piața Romană, No. 6, Room 1104, Bucharest, Romania, Zip Code 010374, emilia.campeanu@fin.ase.ro, 0724.282.461

Miricescu Emilian

Academy of Economic Studies Bucharest, Faculty of Finance, Insurance, Banking, and Stock Exchanges, Piața Romană, No. 6, Room 1104, Bucharest, Romania, Zip Code 010374, miriemil@yahoo.com, 0726.019.076

Abstract: The external vulnerability became an important issue as a result of recent financial crises. The debates focused on the external and public debt sustainability in order to identify the relationship between these two variables in order to investigate the degree of vulnerability of a country from the point of view of its international financial position and internal stability. So, the recent increase of external debt in Romania conduct to the necessity to analyze the debt sustainability for the external position and for the domestic debt. The aim of this paper is to investigate the relationship between public and external debt sustainability in Romania. Using monthly data from 1992 to 2007 we find evidence for weak form of Romanian debt sustainability.

Key words: public debt, external debt, sustainability.

1. Introduction

The external vulnerability became an important issue as a result of recent financial crises. The debates focused on the external and public debt sustainability in order to identify the relationship between these two variables and to investigate the degree of vulnerability of a country from the point of view of its international financial position and internal stability. So, external debt is sustainable if a country “is expected to meet its current and future external debt-service obligations in full, without recourse to debt relief, rescheduling of debts, or the accumulation of arrears, and without unduly compromising growth”⁴¹. This definition reveals the complexity of this concept which is analyzed using different variables and techniques in order to ensure long term debt sustainability without affecting the country’s capacity to service external debt on long run. These variables that are taken into the consideration are economic growth, export, import and fiscal revenue.

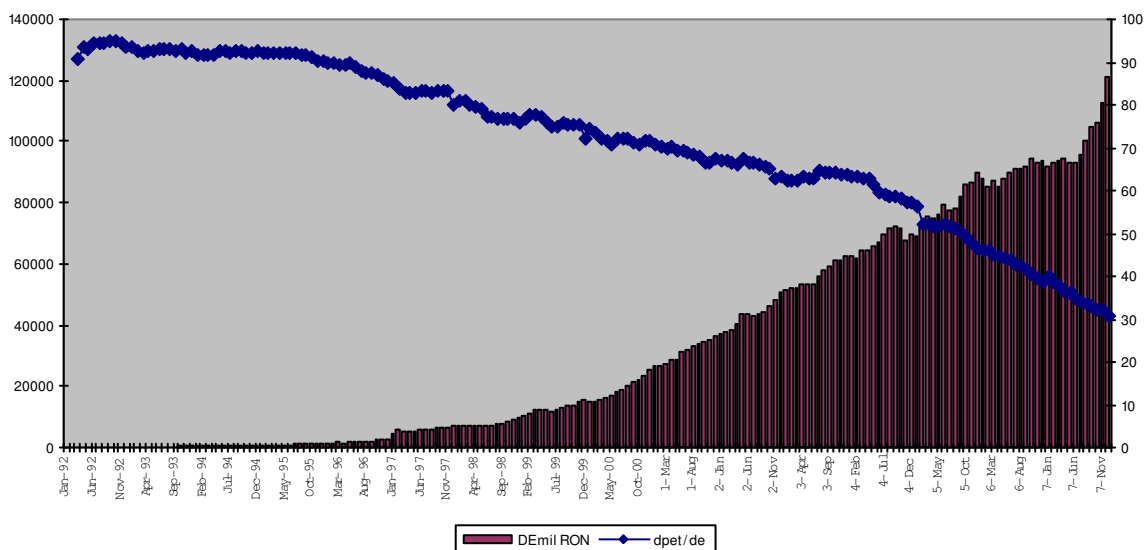
So, considering the relevance of external debt sustainability in relation with public debt sustainability, we find useful the investigation of this issue for Romanian case.

The study is structured as follow. After a brief presentation of the Romanian public and external debt (Section II) we investigate the literature on debt sustainability (Section III). Section IV highlights the results of the empirical tests to analyze the relationship between Romanian public and external debt sustainability. Section V discusses the policy implications of these findings.

2. Romanian external and public debt

External debt is the result of the country financial liabilities that is owed to creditors outside the country. In Romania, external debt has an increasing trend over the period 1992-2007 as a result to external indebtedness of public authorities and private entities. But public external debt has a decreasing trend starting with 2004, when the ratio of public debt to external debt became less then 50 percent. This ratio varies between 94.9 percent in October 1992 and 30.9 percent in December 2007, and shows the external vulnerability caused by private debtors (figure 1).

⁴¹IMF, 1997, pp. 17.



Source: data are from National Bank of Romania.

Figure 1 External debt and external public debt, 1992-2007

3. Review of selected literature

Sustainability of external debt is based on the intertemporal budget constraint which expresses aggregate income of the economy as a function of total expenditure, as follows:

$$Y_t + \Delta B_t + TR_t = A_t + rB_{t-1} + [N_t - (1+i_t)N_{t-1}] \text{ or } TB_t + \Delta B_t + TR_t = rB_{t-1} + [N_t - (1+i_t)N_{t-1}] \quad (1^{42})$$

where: Y - GDP during t period; ΔB - change of gross external debt; TR - net transfer receipts; A -total expenditure of domestic residents on goods and services; r - nominal interest rate; N - foreign currency reserves of central bank; i - interest rate in these reserves; TB - trade balance. These variables can be expressed as ratio of GDP or in real term.

If it is considered the expectation operator, the intertemporal budget identity became:

$$B_t = E_t \sum_{j=t+1}^{\infty} \frac{S_j}{\prod_{i=1}^{j-t} (1+r_{t+i})} \quad (2^{43})$$

So, the external debt at time t is equal to the present value of future net surpluses which is equivalent with

$$\text{external debt sustainability if: } E_t \lim_{N \rightarrow \infty} \frac{B_N}{\prod_{j=1}^{N-1} (1+r_{t+j})} = 0 \quad (3^{44})$$

Investigation of external debt sustainability may also take into the consideration: (i) current account sustainability focused on the composition of CA and on the methods used to finance the CA deficit through foreign direct investments or other. In this context it is useful the net external position (NEP) of a country (Lane and Milesi - Ferretti, 2005); (ii) domestic public debt underlined how it undermines the sustainability target for external debt (Abbas, 2005). Presbitero and Arnone (2006) analyze the external sustainability using domestic public debt because it became an important part of the indebtedness level and interest rates

⁴² Gülcan and Utku, 2006, pp.671.

⁴³ Gülcan and Utku, 2006, pp.672.

⁴⁴ Gülcan and Utku, 2006, pp.672.

on domestic debt constrained the government spending and investment; (iii) economic growth (Bhattacharya, Clements, 2004; Presbitero, 2005); (iv) fiscal deficits and economy (such as consumption, investment) (Agenor, 2004).

External debt sustainability and its incidence on other variables are investigated using different techniques and variables. The procedures are: (i) unit root test for external debt and trade balance or current account; (ii) cointegration regressions among external debt and trade balance or current account, or exports, imports, GDP, and interest rates (Hamilton, Flavin, 1986; Sawada, 1994); (iii) reaction function for external debt expressed by other explanatory variables. Unit root and cointegration tests are useful to analyze the implication of the intertemporal constraint on long run in order to identify if a government can sustain its domestic and external deficits without major adjustments imposed by intertemporal budget identity. Such empirical investigation begin with the study of Hamilton and Flavin (1986), and extended by Wilcox (1989), Trahan and Walsh (1991), Hakkio and Rush (1991), Buitner and Patel (1992), Tanner and Liu (1994), Liu and Tanner (1995), Tanner (1995), Wu (1998).

As a result of the empirical studies, investigation of external debt sustainability can be done by using accounting approach (Cuddington, 1997; Agenor, 2004; Burnside, 2005) and present value constraint approach. According to this last method the debt is sustainable when “NPV of debt (public and publicly guaranteed) to exports ratio and the debt service to export ratio are below certain country specific target levels within ranges of 200-250 percent and 20-25 percent respectively”⁴⁵. These standard levels for different debt ratio are: (i) public external debt is 50 percent of GDP, 200 percent of exports and 250 percent of consolidated general budget revenue; (ii) public external debt service is 20 percent of exports, 25 percent of consolidated general budget revenue; (iii) interest on public external debt is 10 percent of exports and 15 percent of consolidated general budget revenue.

4. Relationship between public and external debt sustainability: evidence for Romania

In order to investigate the relationship between public and external debt sustainability in Romania we use unit root, cointegration and OLS regression for external debt and public external debt. The variables used are external debt (*ED*), public external debt (*PED*), export (*EX*), import (*IM*), trade deficit (*TB*) and current account deficit (*CA*) from January 1992 to December 2007. Unit root tests show that these variables are I(1) according to Phillips-Perron (table 1). As a result we may say that sustainability of external debt and external public debt is weak as a result of the equilibrium relationship on long run between external debt or public external debt and trade or current account deficit over the entire sample.

variable	-Statistic ^t	Test critical values		
		1% level	5% level	10% level
<i>Phillips-Perron</i>				
(<i>PED</i>)	12.09523	3.464827	2.876595	2.574874
(<i>ED</i>)	8.919266	3.464827	2.876595	2.574874
(<i>EX</i>)	18.25251	3.464827	2.876595	2.574874
(<i>IM</i>)	17.76182	3.464827	2.876595	2.574874
(<i>TB</i>)	15.75528	3.464827	2.876595	2.574874
(<i>CA</i>)	15.55951	3.464827	2.876595	2.574874

Table 1 Results of unit root tests

⁴⁵IMF, 1997, pp. 28.

The results of our tests are: (i) external debt determines import and export but there is a weak relationship between them; (ii) public external debt causes import and export and it is influenced by export. So, the regressions results are:

$$ED_t = 286.8678 + 1.013162ED_{t-1} - 0.130557EX_{t-2} + 0.097598IM_{t-2} + \varepsilon_t, \text{ with R-squared} = 0.998789$$

$$PED_t = 180.7910 + 1.009919PED_{t-1} - 0.024882EX_{t-2} + 0.012117IM_{t-2} + \zeta_t, \text{ with R-squared} = 0.998240$$

Investigation of public external debt and external debt using the standard level recommended by World Bank and International Monetary Fund shows that Romanian public external debt is sustainable because these ratios are below targets. For example we present these results, for 2005-2006, in table 2.

	2005	2006	Standard level
Public external debt (% of GDP)	14.4	10.4	50
Public external debt service (% of GDP)	2.5	1.8	
Public external debt (% of export)	43.9	39.4	200
Public external debt service (% of export)	7.7	6.5	20
Interest of public external debt (% of export)	2		10
Public external debt (% of consolidated general budget revenue)	50.1	34.2	250
Public external debt service (% of consolidated general budget revenue)	8.6	5.9	25
Interest of public external debt (% of consolidated general budget revenue)	2.3		15

Source: Romanian Ministry of Economy and Finance

Table 2 Public external debt indicators

Another way to investigate debt sustainability is to use the IMF methodology using sensitivity tests for different macroeconomic perspective such as economic growth, GDP deflator, real interest rate on public debt, primary deficit and gross financing need. The results of these investigations for automatic debt dynamics⁴⁶ are presented in figure 2 and 3.

⁴⁶ Relations and data are from IMF, Romanian Country Report No. 04/221 and No. 07/219.

Automatic public debt dynamics is determinate using equation $[(r-p)(1+g)-g+ae(1+r)]/(1+g+p+gp)$ times previous period debt ratio, with r = interest rate; p = growth rate of GDP deflator; g = real GDP growth rate; a = share of foreign-currency denominated debt; and e = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).

Automatic external debt dynamics is derived as $[r-g-r(1+g)+ea(1+r)]/(1+g+r+gr)$ times previous period debt stock, with r = nominal effective interest rate on external debt; r = change in domestic GDP deflator in US dollar terms, g = real GDP growth, e = nominal appreciation (increase in dollar value of domestic currency), and a = share of domestic-currency denominated debt in total external debt.

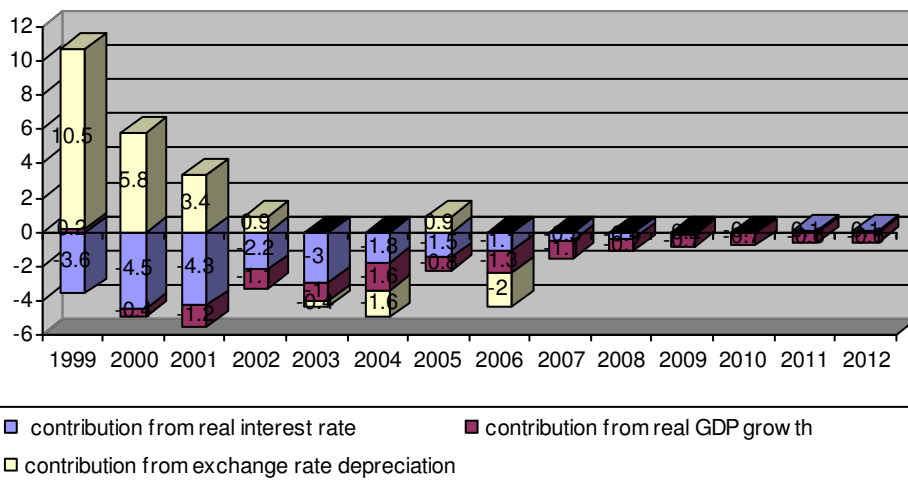


Figure 2 Automatic public debt dynamics

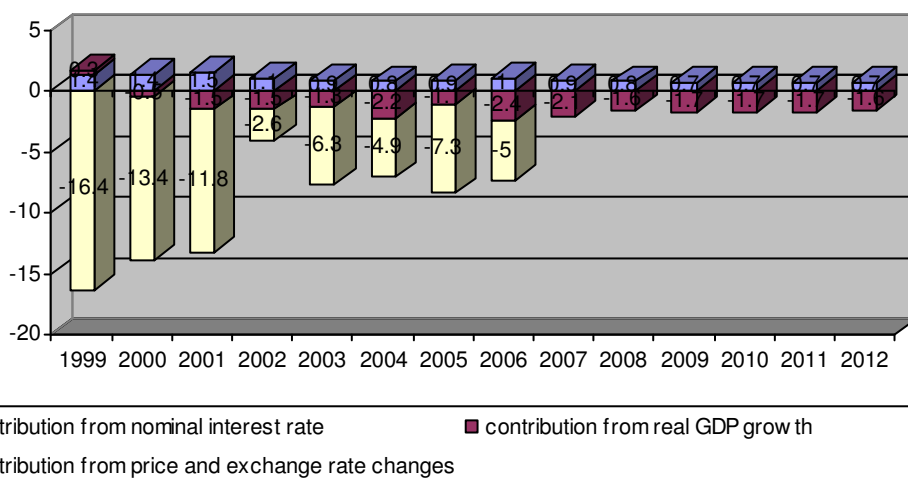


Figure 3 Automatic external debt dynamics

Automatic public debt dynamics had positive value in 1999 and 2000 as a result of the contribution from exchange rate depreciation, and negative for 2001-2012. These negative value express al so the decreasing path of public debt at 11.6 percent of GDP in 2012 according to the IMF projections. For external debt, the automatic dynamics is negative for the entire sample especially as the result of price and exchange rate changes which will conduct to a level of external debt of 32.3 percent of GDP in 2012.

5. Conclusions

The external vulnerability became an important issue as a result of recent financial crises. The debates focused on the external and public debt sustainability in order to identify the relationship between these two variables in order to investigate the degree of vulnerability of a country from the point of view of its international financial position and internal stability. So, the recent increase of external debt in Romania conduct to the necessity to investigate the debt sustainability for the external position and for the domestic debt. In theoretical and empirical studies on this issue are developed many techniques in order to analyze the debt sustainability regarding the existence and the type of sustainability, and the incidence of economic variables on debt sustainability. These variables can be used to influence the dynamics of public and external debt in order to ensure the intertemporal budget constraint. Starting with these methods we find that Romanian debt sustainability is weak and there are evidences for long term equilibrium between debt and current account.

References

1. Abbas, S. M. Ali, Public debt sustainability and growth in Sub-Saharan Africa (post-HIPC): The role of domestic debt, GDN Project on Macroeconomics of Low Income Countries, February 2005
2. Agenor, Pierre-Richard, *The Economics of Adjustment and Growth*, Harvard University Press, Cambridge, 2004
3. Bhattacharya, Rina; Clements, Benedict, Calculating the Benefits of Debt Relief, *Finance & Development*, December 2004, pp. 48-50
4. Buitier, W.H.; Patel, U.R., Debt, Deficits, and Inflation: an Application to the Public Finances of India, *Journal of Public Economics* 47, 1992, pp. 171-205
5. Burnside, Craig, *Fiscal Sustainability in Theory and Practice: A Handbook*, Washington, DC: The World Bank Publications, 2005
6. Cuddington, John T., *Analysing the Sustainability of Fiscal Deficits in Developing Countries*, Working Paper No. 97-01, 1997, Georgetown University, Economic Department
7. Gülcan, Önel; Utku, Utkulu, Modeling the Long-Run Sustainability of Turkish External Debt with Structural Changes, *Economic Modelling* 23, 2006, pp. 669-682
8. Hakkio, C.S.; Rush, M., Is the Budget Deficit “too Large”?, *Economic Inquiry* 29, 1991, pp. 429-445
9. Hamilton, J.D; Flavin, M.A., On the Limitations of Government Borrowing: a Framework for Empirical Testing, *American Economic Review* 76 (4), 1986, pp. 808-819
10. International Monetary Fund, *Debt Relief for Low Income Countries and the HIPC Initiative*, WP/97/24, 1997
11. International Monetary Fund, *The Enhanced HIPC Initiative and the Achievement of Long Term External Debt Sustainability*, prepared by the Staffs of the World Bank and the International Monetary Fund, April 2002
12. International Monetary Fund, *Romanian Country Report No. 04/221*, 2004
13. International Monetary Fund, *Romanian Country Report No. 07/219*, 2007
14. Lane, Philip; Milesi-Ferretti, Gian Maria, *A Global Perspective on External Positions*, IMF Working Paper 05/161, 2005
15. Liu, P.; Tanner, E., Intertemporal Solvency and Breaks in the U.S. deficit process: a Maximum Likelihood Cointegration Approach, *Applied Economics Letters* 2, 1995, pp. 231-235
16. Presbitero, Andrea F., *The Debt Growth Nexus: a Dynamic Panel Data Estimation*, Department of Economics Working Paper No. 243, 2005
17. Presbitero, Andrea F.; Arnone, Marco, *External debt sustainability and domestic debt in Heavily Indebted Poor Countries*, MPRA Working Papers No. 1396, May 2006
18. Sawada, Y., Are the Heavily Indebted Countries Solvent?: Tests of Intertemporal Borrowing Constraints, *Journal of Development Economics* 45, 1994, pp. 325-337
19. Tanner, E., Intertemporal Solvency and Indexed Debt: Evidence from Brazil, 1976-1991, *Journal of International Money and Finance* 14 (4), 1995, pp. 549-573
20. Tanner, E; Liu, P., Is the Budget Deficit “too Large”: Some Further Evidence, *Economic Inquiry* 32, pp. 511-518
21. Treahan, B.; Walsh, C.E, *Testing Intertemporal Budget Constraints: Theory and Applications to U.S. Federal Budget and Current Account Deficits*, *Journal of Money, Credit and Banking* 23 (2), 1991, pp. 206-223
22. Wilcox, D.W., The Sustainability of Government Deficits: Implications of Present Value Borrowing Constraint, *Journal of Money, Credit and Banking* 21 (3), 1989, pp. 291-306
23. Wu, J.L., Are Budget Deficits too Large? Evidence from Taiwan, *Journal of Asian Economics* 9 (3), 1998, pp. 519-528